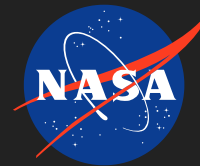


# Decomposing Nitrous Oxide Thruster using Dielectric Barrier Discharge

Completed Technology Project (2011 - 2012)



## Project Introduction

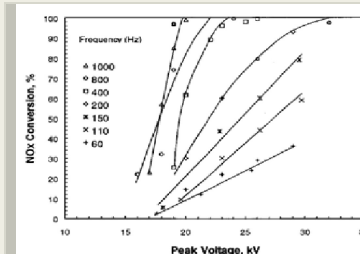
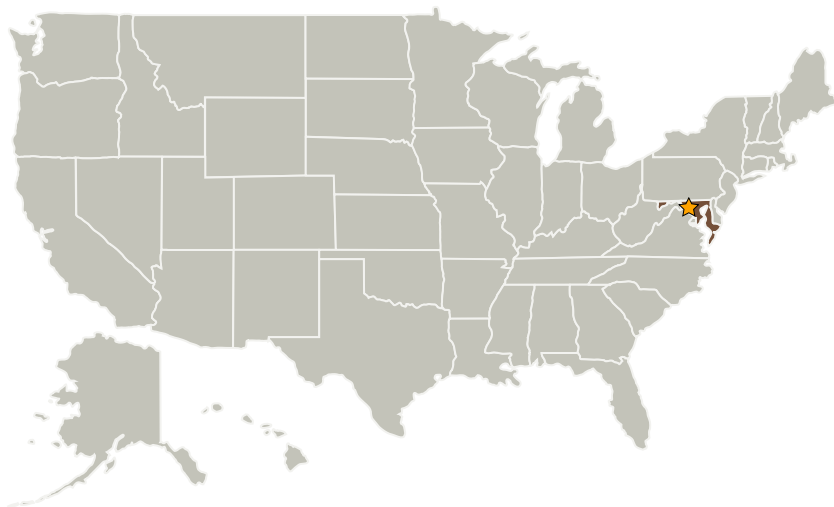
One of NASA's Grand Challenges is to design more efficient propulsion systems. The decomposing nitrous thruster with a dielectric barrier discharge is only one step away from the simplicity of cold gas thrusters, yet offers a theoretical Isp of 200 seconds – closer to the performance of monopropellant technologies.

The University of Maryland is proposing to use a dielectric barrier discharge (DBD) as a means to dissociate N<sub>2</sub>O. DBD uses alternating high voltage differences between two electrodes to create strong electric fields. One or both of the electrodes is covered in a dielectric, and a gap in between allows gas to pass through. Nitrous Oxide sent through the gap between the electrodes has its free electrons accelerated by the large E-field, and in the process the electrons collide with N<sub>2</sub>O molecules.

## Anticipated Benefits

N/A

## Primary U.S. Work Locations and Key Partners



Project Image ROE FY12 CIF 277 CC Decomposing Nitrous Oxide Thruster using Dielectric Barrier Discharge

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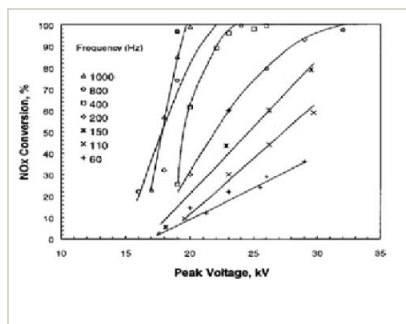


Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
University of Maryland-College Park(UMCP)	Supporting Organization	Academia	College Park, Maryland

## Primary U.S. Work Locations

Maryland

## Images



44.jpg

Project Image ROE FY12 CIF 277  
CC Decomposing Nitrous Oxide Thruster using Dielectric Barrier Discharge  
(<https://techport.nasa.gov/image/1267>)

## Project Website:

<http://aetd.gsfc.nasa.gov/>

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Goddard Space Flight Center (GSFC)

### Responsible Program:

Center Innovation Fund: GSFC CIF

## Project Management

### Program Director:

Michael R Lapointe

### Program Manager:

Peter M Hughes

### Project Manager:

Michael A Johnson

### Principal Investigator:

Eric H Cardiff

### Co-Investigator:

Raymond Sedwick

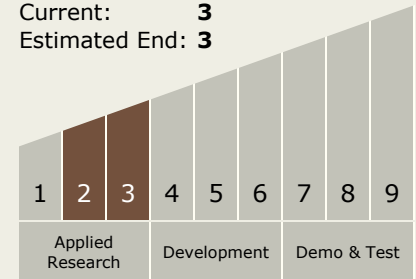
# Decomposing Nitrous Oxide Thruster using Dielectric Barrier Discharge

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## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.1 Chemical Space Propulsion
    - └ TX01.1.7 Cold Gas